Water Supply

Background

Despite a statewide average precipitation of 45 inches per year, New Jersey must plan its use of water carefully to prevent regional shortages and to avoid ecological impacts with water overuse. From 1990 to 1999, average annual surface-water withdrawals in the state were 727 billion gallons per year and groundwater withdrawals were 243 billion gallons per year. This adds up to an average withdrawal of 970 billion gallons per year.[1]

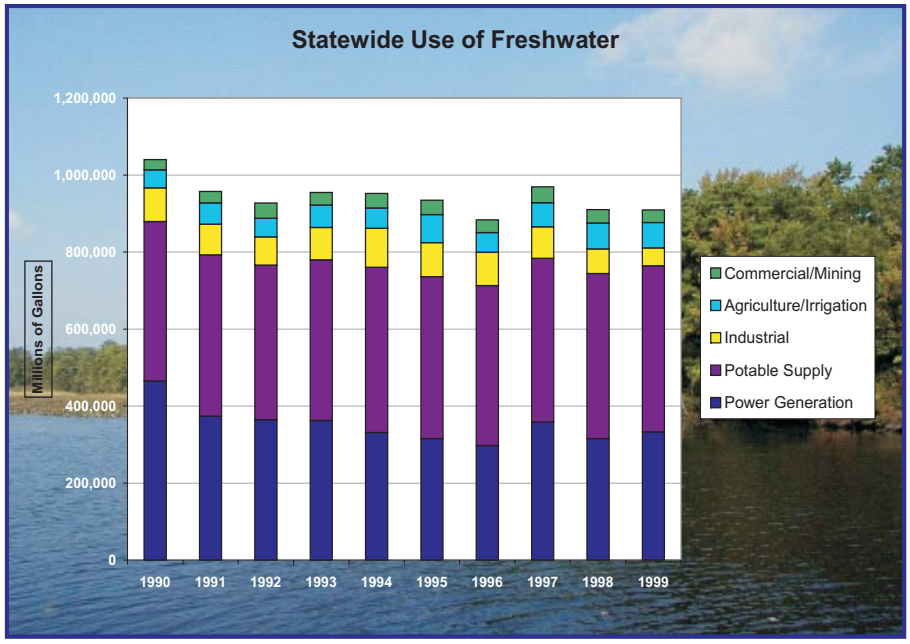
New Jersey's formal water supply planning process, The New Jersey Statewide Water Supply Plan, provides a framework to guide the management, conservation and development of the state's water resources. It balances the demand for potable, industrial, recreational and ecological uses to ensure that a safe and adequate water supply will be available into the foreseeable future, including during times of drought. The plan and its periodic revision are mandated by the 1981 Water Supply Management Act. DEP released the first plan in 1982 and the first major revision in 1996. The next update of the New Jersey Statewide Water Supply Plan is due to be completed in 2005. However, the lessons learned during recent droughts stress the immediate need for actions to ensure sufficient water supplies statewide. In response, the department has partnered with local authorities to support projects to recycle wastewater and is undertaking an 18-month project to evaluate water-supply infrastructure throughout the state. The study will examine existing major water transmission routes and interconnections to assess how these separate systems can be integrated and operated as a statewide system to best manage and distribute resources during an emergency.

Trend

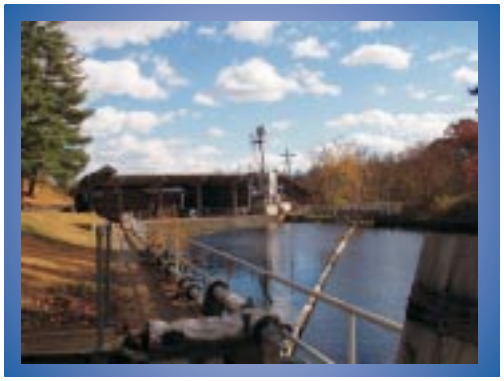
The population of New Jersey grew by 680,000 between 1990 and 2000 and is projected to grow by 650,000 by 2010. This population growth and regional shifts in population have placed an additional demand on the state's water resources and water supply infrastructure, particularly in geographic areas that have not previously experienced high water demand. Additional demand also has led to water supply problems in many areas of the state, particularly during times of drought.

DEP data indicate that during the 1990s there was a shift in the areas of the state where highest demand was concentrated. In addition, as the graph below indicates, statewide total annual water use has remained fairly constant. DEP will continue to monitor trends in water use to see where steps can be taken to reduce consumption or reuse water. (See "Statewide Use of Freshwater" below).

New Jersey governors were forced to declare statewide or regional drought emergencies in 1995, 1997, 1998, 1999, 2001, 2002 and 2003, issuing restrictions on water use. These drought restrictions have a direct impact on the state's economy, but they are necessary to protect potable supplies and aquatic resources. Potential adverse effects from high water use during droughts include reduced ability of a stream to assimilate pollutants[1], decline in reservoir safe yield[2], harm to aquatic biota from effects such as increased algal growth and sedimentation, increased saltwater intrusion in coastal estuaries and aquifers, and added stress to water distribution systems.



The state's stream gauging and groundwater monitoring networks show that during the 2002 drought, some areas had the lowest stream flows and groundwater levels ever recorded. New surface-water withdrawals, increased withdrawals from shallow aquifers, increasing consumptive use, and changing climate can all influence stream flow and groundwater levels. Declining groundwater levels can result in well failure and reduced stream flow, which leads to impairment of aquatic ecosystems, diminished capacity for wastewater assimilation, and reduction in downstream reservoir safe yields.



Outlook and Implications

Each day New Jersey discharges approximately 750 million gallons of wastewater directly to the ocean and bays. Reusing less than one percent of this wastewater discharge could offset the state's entire consumptive water use. Reclaimed Water for Beneficial Reuse (RWBR) involves using highly treated, reclaimed wastewater to offset potable ground and surface water withdrawals. Reuse reduces demand on public water supplies and keeps water in the natural hydrologic system, which can be extremely beneficial during drought. Some examples of uses for RWBR are landscape and agricultural irrigation, industrial uses, fire protection, aesthetic fountains and lagoons, construction uses and sewer flushing. Depending upon the wastewater source and the proposed reuse, extensive treatment and disinfection may be required to protect public health and environmental quality, while other applications involving limited public access may require substantially less treatment. RWBR is especially promising in areas where regional sewage treatment plants discharge to the ocean or bays.

Preliminary estimates indicate that the demand for potable water by golf courses and other major consumptive users in coastal areas is more than 5 billion gallons per month. The use of reclaimed water for these activities in place of potable sources can protect a major portion of the coastal water supply. To encourage water reuse, in January 2005 the DEP helped fund 23 water demonstration projects throughout the state with a total of $35 million dollars in grants. The projects will use treated wastewater for irrigation, cooling operations at industrial facilities and to prevent saltwater intrusion, among other projects.

More Information

www.nj.gov/dep/watersupply/wsa_about.htm
www.nj.gov/dep/watersupply/wsa_public.htm
www.njgeology.org/geodata/dgs04-9.htm

References

Unless specifically cited, the information in this report was provided by DEP's Water Supply Administration and its "Water Supply Action Plan 2003."

[1] Domber, S.E. and Hoffman, J.L., 2004, New Jersey water withdrawals, transfers, and discharges on a watershed management area basis, 1990-1999: N.J. Geological Survey Digital Geodata Series DGS 04-9, computer workbook.
[2] Assimilative capacity is the ability of a water body to absorb, or assimilate, pollutants without suffering adverse effects.
[3] Safe yield is the amount of water a reservoir can supply without suffering adverse effects.